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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/871,224	05/31/2001	Klaus Breitschwerdt	10191/1811	1697

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EXAMINER

TRAN, BINH X

ART UNIT

PAPER NUMBER

1765

DATE MAILED: 06/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/871,224

Applicant(s)

BREITSCHWERDT ET AL.

Examiner

Binh X Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 10-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 6) ☐ Other:

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I (claims 1-9, 20) in Paper No. 7 is acknowledged.
2. Claims 10-19 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 7.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claim 20 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 20 line 11, "between the means for generating" lacks antecedent basis. Since applicants disclose three different "means for generating", it is unclear from the claim what specific "means for generating" applicants wish to refer.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the

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applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-3, 6-9, 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Yin et al. (US 6,189,484).

Yin discloses a device for etching a semiconductor substrate (140) using inductively coupled plasma, the device comprising:

an ICP source (126, 128) for generating a high-frequency electromagnetic alternating field (Fig 1, col. 5 lines 42-59);

a reactor for generating the inductively coupled plasma composed of reactive particles by an action of the high frequency electromagnetic alternating field on a reactive gas (130) (See Fig 1);

an arrangement (150a-150c) for generating static magnetic field between the ICP source (126, 128) and the semiconductor substrate (140), the arrangement having at least two magnetic field toroidal or solenoidal (150a-150c) (See Fig 1, col. 6 lines 39-52, col. 7 lines 25-40, read on the limitation of "magnetic field coil").

Respect to claim 2, Yin discloses at least two magnetic filed coil (150a-150c) surround the reactor in some areas between the ICP source and the semiconductor substrate (Fig 1). Respect to claim 3, Yin discloses the wall (104) of the chamber is formed by multiple annual channel (152a-152c) associated at least two magnetic field coils (150a-150c) (See Fig 1, read on spacer limitation).

Respect to claim 6, Yin does not explicitly disclose the static magnetic field is at least approximately parallel to a direction defined by a tie line connecting the

semiconductor substrate. However, Yin clearly discloses the axial center (149) (read on "tie line"). Yin further discloses that the static magnetic field defines a magnetic bucket that confines the plasma to the axial center of the chamber (Fig 1, col. 7 lines 35-40). Since Yin teaches the same apparatus with the same element arrangement as claimed, under the principle of inherency the invention is considered to be anticipated by Yin.

Respect to claim 7, Yin discloses the semiconductor substrate (140) is arrangeable symmetrically between the at least two magnetic field coil (150a-150c) (See Fig 1). Respect to claim 8, Yin teaches the semiconductor substrate (140) is arrangeable in the lower area. Yin further teaches the output area of one of the at least two magnetic field coils (150a-150c) faces away from the inductively coupled plasma, and within a space defined by another one of the at least two magnetic coil (See Fig 1, the output of the magnetic coil is located below and away from the plasma (136)).

Respect to claim 9, Yin discloses the substrate electrode (138) is connected to the semiconductor substrate (140) so that it is exposed to a component magnetic field of the one of the at least two magnetic field coils (150a-150c) and facing away from the inductively coupled plasma.

Respect to claim 20, Yin discloses:

means (126, 128) for generating a high-frequency electromagnetic alternating field (Fig 1, col. 5 lines 42-59);

means for generating the inductively coupled plasma composed of reactive particles by an action of the high frequency electromagnetic alternating field on a reactive gas (130) (See Fig 1);

means (150a-150c) for generating static magnetic field between the means (126, 128) for generating high-frequency electromagnetic alternative field and the semiconductor substrate (140) by using at least two magnetic field coils arranged one above the other (150a-150c) (See Fig 1, Fig 5, col. 6 lines 39-52, col. 7 lines 25-40, read on the limitation of "magnetic field coil").

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yin in view of Lymberopoulos et al. (US 6,247,425).

Yin fail to disclose that the magnetic field generated by magnetic field coils is at least one of variable over time and pulsable by a power supply unit. In an ICP etching device, Lymberopoulos discloses that the two magnetic coils (150a, 150b) is capable of generating variable over time and/or pulsable by power supply (col. 5 lines 52-60, col. 6 lines 25-35). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Yin in view of Lymberopoulos by using magnetic field coils capable of generate the magnetic field of variable over time and/or pulsable by a power supply unit because it allows more control of the magnetic flux.

9. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yin in view of Naito et al. (US 6,333,269).

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Yin fails to disclose the current flow though at least two of the magnetic field coils in opposite direction. Naito discloses that the current flow through the two magnetic coils (13 and 14) is in the opposite direction (col. 1 line 61 to col. 2 lines 5). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Yin in view of Naito by having the current of the two magnetic field in the opposite direction because it will help to adjust the shape of the magnetic field.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh X Tran whose telephone number is (703) 308-1867. The examiner can normally be reached on Monday-Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin L Utech can be reached on (703) 308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.


BENJAMIN L. UTECH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700

Binh X. Tran
May 30, 2003